EXPLANATION OF PLATE XV.

Fig. 1. *Blysmia ruficollis* (♀).
Fig. 2. *Phocylides collaris* (♂).
Fig. 3. *Achrionota bilineata* (♂).
Fig. 4. *Ionthocerus ophthalmicus* (♂); 4 *a*, right fore leg. The hairs on the antennæ are too delicate to be represented in a figure of this size.
Fig. 5. *Prophthalmus planipennis* (♂).
Fig. 6. —— *sanguinalis* (♂).
Fig. 7. *Cordus semipunctatus* (♂); 7*a*, head and antennæ, side view.
Fig. 8. *Eupsalis promissus* (♂). The antennæ are not sufficiently accurate as regards the last five joints.
Fig. 9 *a*. Head of *Amorphocephalus*, sp. nov. (♀), (prothorax canaliculate); 9 *b*, head of *Amorphocephalus*, sp. nov. (♀), (prothorax not canaliculate, allied to *A. australis*, Lac.).
Fig. 10 *a*. Side view of the head of *Amorphocephalus sulcicollis* (♂); 10 *b*, ditto, top view.
Fig. 11. Side view of the head of *Cordus hospes*, Germ., for comparison.
Fig. 12. Head and antenna of *Prophthalmus sanguinalis* (♀).
Fig. 13. Head and antenna of *Stratiorrhina xiphias* (♂), Westw. (*Arrhenodes*).

XLVII.—*Notes on the Mud-Tortoises of India* (Trionyx, *Geoffroy*). By Dr. J. E. Gray, F.R.S. &c.

The Three-clawed or Mud-Tortoises are a very natural and well-defined group; but the division of them into species has been a subject of great difficulty to European zoologists, chiefly arising from the very imperfect material which they have had at their command.

Formerly Geoffroy, Bell, and Fitzinger seem to have regarded the extent of the union of the ribs as a character of a species; the latter even attempted to divide them into genera from characters derived from this part. But it is now well understood that the extent to which the ribs are united depends entirely upon the age of the animal, the union being only partial in the young, and entire in the adult, as in the land tortoises and terrapins.

The number, extent, and shape of the sternal callosities no doubt afford very good characters for the distinction of the species, if adult animals are compared together; but they are gradually developed, and in some species (or perhaps in some individuals of the same species) they are much later developed and much longer in coming to their perfect state than they are in others. This is also the case with the development of the odd bone in front of the dorsal disk; so that these parts can only be used as characters when specimens of the same age and stage of development are compared, and especially specimens which have arrived at their adult state.

The sternum being furnished with flaps on the sides (which cover the legs when they are contracted), or being narrow at the sides and leaving the legs bare (as in most freshwater and marine tortoises), furnishes a most natural and easily observed character for the division of the group, and as such has been used by most authors. But it has been shown that each of these groups contains animals with very different skulls; and it is a matter of serious consideration whether the form of the skull, on which such important peculiarities in the animal economy depend, is not of more importance than the covering or exposure of the feet when they are withdrawn. When first the covering of the feet was observed, it was connected with a bony margin to the dorsal disk; but it is now well ascertained that many species with covered feet have the margin flexible and without bones, like the other mud-tortoises. It is to be remarked that all the tortoises that have flaps to cover their feet have callosities on the two anterior bones of the sternum, which have never yet been observed in those which have naked feet. This character is common to those that have thin skulls and jaws and narrow alveolar edge, and those which have thicker skulls and wider alveolar surface.

Cuvier and Wagler described and figured the skulls of two or three species of this group; but all the skulls which they had the opportunity of studying belonged to a single type of form, of a thick and solid consistency. In my 'Catalogue of Shield Reptiles in the British Museum' I figured a few skulls of the species which we then possessed, pointing out that they belonged to two different groups—one solid, and the other light and thin; and in the 'Supplement to the Catalogue of Shield Reptiles' I figured and described the skulls of many more species. I used this character to separate the soft-disk mud-tortoises into two families, Trionychidæ and Chitradæ—one having a solid, and the other a thin and light skull; and I divided the genera of each family according to the form of the skull, especially the form of the alveolar edge of the jaws. I consider this one of the most important steps towards the proper division of the species and defining them, as it affords us the power of dividing them into natural groups: for example, *Chitra indica*, *Trionyx gangeticus*, and *Tyrse nilotica* have been considered specimens of the same species, but they belong to two very different families; *Chitra indica* and *Pelochelys Cantori* have been regarded as the same species, the one having a very long ovate, and the other a short square skull. In the same manner *Fordia africana* and *Tyrse nilotica* (the one having a broad, flat alveolar surface, and the other a sharp thin one) have been regarded as the

same species; whilst a Central-African tortoise, *Aspidonectes aspilus*, has been separated from *Tyrse nilotica* because the individual had slightly differently developed sternal callosities, whereas the examination of the jaws shows that they are the same species.

The study of the jaws at various ages has shown that the form of the alveolar surface is the same in the young as in the adult, and therefore furnishes a very excellent character for distinguishing the species; and if one had skulls of all the species in the collection, they would no doubt afford the characters of the various kinds, and also the best arrangement of them into groups. But, unfortunately, that is not the case, and we are obliged to do the best we can under the circumstances. Unfortunately, too, the skulls cannot be extracted from the stuffed specimens without destroying them; and it is always difficult to be certain that the skulls and skeletons that you receive belong to the species they are said to represent; for the characters by which the species are distinguished in their perfect state have been destroyed. Every care has been taken to prevent an error of this kind; and in general the characters of the genera have been taken from the examination of the head in the perfect animal, and of the skulls extracted from duplicate specimens. It is much to be regretted that the Indian zoologists do not study the numerous Asiatic species and give us the result of their examination, considering that there are only two Indian zoologists in modern times who have paid the slightest attention to these animals, and they have not yet learned the elements of herpetology. Thus Mr. Theobald and Dr. Anderson have described two most different animals under the name of *Trionyx Phayrei*, and have described them in such an incorrect and imperfect manner that it is impossible to make out to what species, or section, or genus either of them is referable.

The receipt of some additional specimens of mud-tortoises and their skulls required that they should be determined; and to do this I have been induced to study and revise what I had formerly written: as our materials are so imperfect, from the Indian collectors not sending home specimens, it is a matter of great difficulty. We know far less of the tortoises of our Indian possessions than we do of those of almost any other part of the world. Experience has shown me that the most reliable character for the distinction and arrangement of the tortoises, and especially of the mud-tortoises, is to be obtained by the study of the skulls; I have therefore been particular in collecting them, and (where it could be done without injury) have had the skulls removed from several of the specimens.

The result of this examination has been the discovery of serious mistakes, some of the separate skulls received having been assigned to the wrong species. Thus the skull which was thought to belong to the *Trionyx hurum* is found to belong to *Trionyx gangeticus* of Cuvier; the skull which was regarded and figured as belonging to *Potamochelys stellata* (and which was received as a present from Professor Oldham) is found to be the skull of a species of *Emyda*. Such mistakes were unavoidable with the very imperfect materials which we had at our command, and could only be corrected as more authentic specimens were procured.

MUD-TORTOISES (*Trionychoidea*).

General Hardwicke, of the Bengal Artillery, at the end of the last century made at Futteghur a series of drawings (now in the collection in the British Museum) of the mud-tortoises (*Trionyches*) which he obtained from the Ganges:—

1. The "*Sewteree.*" This is the *Chitra indica* of the Catalogue of Shield Reptiles. The figure is copied in the 'Illustrations of Indian Zoology.'

2. The "*Kaavez*," which is the *Trionyx hurum* of the 'Illustrations of Indian Zoology' and of this paper.

3. The "*Dekoolee*," which is the *Trionyx gangeticus* of Cuvier and this paper.

Hardwicke figures the *Dhank* or *Jaank*, which appears to be a larger specimen of the same species.

4. The "*Bun-Goma*" or "*Turpin*," which is an *Emyda*, probably *Emyda punctata*. The figures of the young and old are copied in the 'Illustrations of Indian Zoology' as *Trionyx punctata*.

5. *Trionyx subplanus*; but it is from a dried specimen from Java. The figure is copied in the 'Illustrations of Indian Zoology.'

Dr. Buchanan-Hamilton, a friend and fellow labourer of General Hardwicke (who allowed Hardwicke to have copies made by his own artist of the greater part of the fish he described, which are now in the British Museum), figured many species of mud-tortoises of India. The collection of his drawings was in the India House, and is now in the India Museum at Westminster.

1. *Testudo dura* is *Emyda punctata*.

2. *Testudo hurum* is copied as *Trionyx hurum* in the 'Illustrations of Indian Zoology.' The *Trionyx hurum* of this paper.

3. *Testudo chin*. This is copied in Gray's 'Synopsis of

Reptiles,' tab. x., and is the same as the former, *Trionyx hurum*.

4. *Testudo ocellatus*. Copied in Gray's 'Illustrations of Indian Zoology.' Called *Trionyx ocellatus* there and in this paper.

5. *Testudo gataghol*. Copied as *Trionyx javanicus* in Gray's 'Illustrations of Indian Zoology;' but this now proves to be a new species of *Aspilus*, named *Aspilus gataghol* in this paper.

6. *Testudo chitra*. This is the *Chitra indica* of the 'Catalogue of Shield Reptiles in the British Museum.'

In my 'Synopsis of Reptiles' I described some of these drawings; and in the 'Illustrations of Indian Zoology' I published a selection from them, which I believe were the first published figures of Indian mud-tortoises. This book contains some mistakes in nomenclature; but it is to be recollected that when it was published (in 1831) there was not a single specimen of the Asiatic species of the family in this country.

In 1809 M. Geoffroy, in the 'Annales du Muséum d'Histoire Naturelle' (vol. iv. p. 1), formed the genus *Trionyx*, and described the species which had come under his notice. They are as follow:—

1. *Trionyx subplanus*, p. 15, tab. v. fig. 1. This species is established upon the bones of a dorsal disk; and the habitat is unknown. There is little doubt that it is the *Dogania subplana* of my 'Catalogue of Tortoises.'

2. *Trionyx ægyptiacus*, p. 12, tab. i. fig. 2, a beautiful figure of the back and lower surface of the animal, and of the bones of the back and sternum. This is the *Tyrse nilotica*.

3. *Trionyx stellatus*, p. 13. From the *Testudo cartilaginea* of Boddaert, which the French had taken from the Dutch museum; a young specimen, peculiar for having five stars in the hinder part of the carapace. It is not known from what country it came, and is in too bad a state to determine; Duméril and Bibron consider it the young of *Gymnopus javanicus*.

4. *Testudo carinatus*, p. 14, tab. iv., which represents the dorsal and sternal disks of a young half-grown specimen, of which we do not know the locality; but being without its head it is impossible to tell whether it belongs to *Trionyx*, *Platypeltis*, or any other genus that has four callosities. It is peculiar for having the front odd bone at a considerable distance from the dorsal disk. Schweigger changed the name of this species to *Trionyx Brongniartii*; and Bibron considered it the young of *Gymnopus spiniferus*, which he confounded with *Testudo ferox* of Pennant.

5. *Trionyx javanicus*, p. 15, tab. iii., representing the dorsal

disk without the odd bone, and the sternal disk with two narrow lateral callosities. From Java. Though it is without its head, I have no doubt that this is the *Aspilus cariniferus* of my Catalogue, which has the odd bone in front of the dorsal disk separate from the others, and smooth, except in the adult.

6. *Trionyx coromandelicus*, p. 16, tab. v. fig. 1, representing the dorsal disk. From Coromandel. This is a species of *Emyda*; but one has no means of knowing to which species of the genus it belongs.

The two following species he had not seen :—

7. *Trionyx georgicus* (the *Trionyx ferox* of Pennant). From North America. *Platypeltis ferox* of my Catalogue.

8. *Trionyx euphraticus*, p. 17 (*Testudo rafeht* of Olivier). From the Euphrates. *Rafetus euphraticus* of my Catalogue.

Schweigger published his 'Prodromus Monographiæ Cheloniorum' in 1814; but the manuscript was presented to the Institute before 1809, for it is quoted by Geoffroy in his essay; and it was originally printed in the 'Königsb. Archiv für Naturwissensch.' fasc. iii. & iv. Instead of the original name given by himself (*Amyda*), he adopts Geoffroy's genus *Trionyx* (p. 14), containing :—

1. *Trionyx ferox*, Pennant, from North America.
2. *Trionyx ægyptiacus*, Geoffr., from the Nile.
3. *Trionyx euphraticus*, Olivier (tab. 41), from the Euphrates.
4. *Trionyx javanicus*, Ann. du Mus. iv. tab. 3, from Java. "Boulouffe" according to Leschenault.
5. *Trionyx Brongniartii*, the *Trionyx carinatus*, Geoff. Ann. du Mus. iv. tab. 4.
6. *Trionyx granosus*, Schœpf, Test. tab. 30, *a* & *b*. An *Emyda*.
7. *Trionyx subplanus*, Geoffr. *Dogania subplana*.

Dr. John Wagler, in his 'Natürl. Syst. d. Amphibien,' 1830 (large folio), figures the following.

Tab. 2. fig. I. represents, under the name of *Aspidonectes javanicus*, a young animal, which may be the same as the *Trionyx javanicus* of Geoffr., whose figure of the dorsal disk (tab. iii.) he copies.

Tab. 2. figs. XIII.–XX., called *Aspidonectes gangeticus*, are copied from Cuvier's figures of the bones of *Trionyx gangeticus* of Duvaucel.

Tab. 2. figs. XXXIV., XXXV., *Aspidonectes carinatus*, are copied from Geoffroy's figures of *Trionyx carinatus*.

Tab. 2. figs. XXI.–XXXIII., bones of the various parts of *Trionyx coromandelicus*, Geoffroy (*Testudo granosa*, Schœpf). A species of *Emyda*.

Fam. **Chitradæ.**

Chitra.

1. *Chitra indica.* (The Sewteree).

"*Sewteree,*" Hardwicke, icon. ined.
Trionyx ægyptiacus, var. *indicus,* Gray, Ill. Ind. Zool. i. tab. 80 (copy of Hardwicke).
Testudo chitra, Buchanan-Hamilton, icon. ined.
Trionyx indicus, Gray, Synopsis, p. 47.
Gymnopus lineatus, Duméril & Bibron, Erp. Gén. ii. p. 491.
Chitra indica, Gray, P. Z. S. 1864, figs. 11, 12 (skull); Cat. Shield Rept. B. M. p. 70, tab. 41 (skull).

General Hardwicke observes, "The *Sewteree* found in the Ganges grows to the size of 240 pounds;" with a green head and the back of the neck striped. It is described in the 'Suppl. Cat. Shield Rept.' under the name of *Chitra indica.* It is known by the eyes being very near the end of the nose, and, according to Hardwicke's figure, by being marked on each side of the pupil with a spot.

The top of the head and back of the neck are lined. It is different from all the other mud-tortoises in having an elongate ovate, very thin skull, with weak jaws, with only a linear alveolar process.

Hardwicke's figures are copied in Gray's 'Illustrations of Indian Zoology' (tab. x.) under the name of *Trionyx ægyptiacus,* var. *indica.* Buchanan-Hamilton had it in his drawings, figured under the name of *Testudo chitra*; in my 'Synopsis of Reptiles' I defined it as *Trionyx indicus*; and in the Tortoises of the British Museum, after examining the skull, I formed it into a genus under the name of *Chitra indica,* and figured its skull in the 'Catalogue of Shield Reptiles.' It is the *Gymnopus lineatus* of Duméril and Bibron ('Erpétologie Générale').

Fam. **Trionychidæ.**

* *Sternal callosities four, lateral and posterior; all broad and well developed in the adult.*

Nilssonia.

Skull rather elongate; nose shorter than the diameter of the orbit; alveolar process broader behind; separation between the alveolar surface and groove in the skull to the inner nostrils narrower, and deeper as well as narrower behind. Alveolar process of lower jaw very broad, especially in front, with a very deep, broad, longitudinal, central impression on the front half; rather concave on the hinder part of the sides, with a well-marked elevated ridge on the inner margin.

Skull in the British Museum, presented by Charles Falconer,

Esq. (68. 2. 12. 15). It is known from the skulls of *Trionyx*, which it greatly resembles, by the narrowness of the groove in front of the palate to the internal nostrils; in *Trionyx gangeticus*, *T. Jeudii*, and in *T. Leithii* this groove is broad and shallow, and nearly of uniform width.

1. *Nilssonia formosa.*

Young only known. Callosities not developed.

Back of the crown with a broad transverse pale band.

Trionyx formosus, Gray, P. Z. S. 1869, p. 217, tab. 15. fig. 1; Suppl. Cat. Shield Rept. p. 99.

Hab. Pegu (B.M.).

The skull of the young is shorter and broader than those of the adults. I believe this arises only from difference of age.

TRIONYX.

The dorsal disk in the young animals is generally marked with three pairs of black spots, which have concentric pale rings within. These spots often last in a more or less perfect degree throughout the life of the animal; sometimes the anterior and sometimes the posterior pair, and rarely a spot on one side of these pairs, are deficient. The crown of the head of the young specimens is generally marked with spots of various colours, which become more and more indistinct as the animal grows. I believe that these spots are characteristic of the species; and sometimes whole series of species have characteristic spots—that is to say, on the sides of the crown and face.

† *Crown of head olive, with radiating black lines behind.*

1. *Trionyx gangeticus.* (Dekoolee.)

Skull short, broad; nose suddenly bent down, with a rounded outline; eyes within a very short distance of the cavity of the nostrils, which is not as long as the diameter of the orbit; alveolar surface of the lower jaw deeply concave, with a very slight, indistinct, central longitudinal ridge.

"*Dekoolee*," Hardwicke, icon. ined.

Trionyx du Gange, Cuvier, Oss. Foss. v. pt. 2, p. 187, tab. ii. figs. 5–8 (skull).

Trionyx gangeticus, "Duvaucel," Cuvier, Règne Anim. vol. ii. p. 16; Gray, Cat. Shield Rept. B. M. p. 66, Suppl. p. 97 (skull only).

Gymnopus Duvaucelii, Duméril & Bibron, Erpét. Gén. vol. ii. p. 47.

Aspidonectes gangeticus, Wagler, Amphib. Taf. 2. figs. 13–22 (copied from Cuvier).

Trionyx javanicus, Gray, Cat. Shield Rept. p. 67 (not synonyma).

Potamochelys stellata, Gray, P. Z. S. 1864, p. 85; Suppl. Cat. Shield Rept. B. M. p. 104 (animal only, not skull).

Var.? The black lines irregular.

"*Jaank*," Hardwicke, icon. ined.

General Hardwicke figures this species under the name of "Dekoolee," which grows to the weight of 120 pounds, and is found in the Ganges. The "Dekoolee" has been referred to the *Trionyx javanicus* of Geoffroy; but this is evidently a mistake, as that species is figured with two lateral transverse callosities, whereas all the more adult specimens of the "Dekoolee" in the British Museum have four well-developed callosities.

Cuvier, in the 'Ossemens Fossiles' (vol. v. pt. 2, p. 187), figures a skull under the name of "*Trionyx du Gange*" (tab. ii. figs. 5–8), and in the 'Règne Animal' he refers it to *Trionyx gangeticus*, Duvaucel (vol. ii. p. 16).

I find by comparison that the skull which I extracted from a half-grown specimen (but retaining the black rays on the crown, and having the four sternal callosities well developed) is exactly like the skull figured by Cuvier as the *Trionyx du Gange*, and by me under the name of *Trionyx gangeticus* in the 'Catalogue of Shield Reptiles' (t. 42. fig. 1).

Cuvier's figure most correctly represents the skull of this species, both in outline and in the proportion of the nose to the orbits, and in the form of the bones on the underside of the skull, which is very different from that of the skull of *T. Jeudii*.

There are now in the Museum four skulls of this species, of different sizes, which retain their characters most distinctly marked.

Duméril and Bibron change the name of this species to *Cryptopus Duvaucelii*, and quote *Trionyx hurum*, Gray (Synopsis of Rept. p. 49, tab. x.) as a synonym of this species. Believing that they had the original specimen to compare with my figure, I adopted their idea, and described the animal I so named as the animal of *Trionyx gangeticus*, Cuvier; but the examination of the skull of what I had called *Trionyx gangeticus* shows *that* to be the species the skull of which was figured and described by Cuvier when he established the species.

General Hardwicke figures a specimen of almost one uniform green colour, which, he says, is called "Jaank" or "Dhank" in the country, and is found in the Ganges and grows to the weight of 240 pounds. Unfortunately he does not figure the underside. The top of the head is green, marked with a series of rather irregular black lines; and there is one from the back edge of the eye, very different from the regular diverging lines of *Trionyx gangeticus*; but it may be only a variety, or it may be the *Aspilus gatughol* with a lined head figured by Hamilton.

2. *Trionyx Leithii*. (The Poonah Mud-Tortoise.)

A small species; the shield about 10 inches long and 6½

broad. The alveolar surface of the lower jaw nearly flat, with a very slight longitudinal ridge across the front end.

Hab. Poonah (*Dr. Leith*).

Dr. Leith gave the British Museum a stuffed specimen and a perfect skeleton of this species.

The head of the dried specimen, unfortunately, does not show any distinct indication of colour by which to distinguish it; but Mr. Charles Waterhouse thinks he can observe some obscure indications of olive stripes radiating from a centre in the hinder part of the crown. The skeleton is mentioned by mistake in the 'Supplement to the Catalogue of Shield Reptiles' (p. 102) under *Aspilus cariniferus*; and Dr. Günther had given this name to both specimens; it has four well-developed callosities to the sternum.

The skull is rather short and narrow; the nose shelving to the forehead, with a rather tapering outline. Eyes a very short distance from the cavity of the nostrils, not half as long as the diameter of the orbits. Alveolar surface of the lower jaw broad, very slightly concave, with a very indistinct central ridge in front, most elevated in the middle of the front central portion of the alveolar surface. The centre of the front edge of the lower jaw of the skeleton marked with a deep notch; but this may be only an individual peculiarity, because there is no indication of it in the stuffed specimen.

†† *Crown of the head olive, closely and minutely punctured with black.*

3. *Trionyx peguensis.*

Trionyx peguensis, Gray, Cat. Shield Rept. p. 99.

Hab. Pegu. Head and skull only known.

This is a large species. The skull has a broad palatal groove to the nostrils.

††† *The hinder part of the crown and sides of the head marked with pale spots.*

4. *Trionyx hurum.* (The Kaavez.)

Crown of the head varied with irregular black lines, a yellow spot on each side of the crown and at the back angle of the mouth.

"*Kaavez*," Hardwicke, icon. ined. B. M.

Trionyx hurum, Gray, Synopsis Rept. tab. x. (copied from Hardwicke); Ill. Ind. Zool. tab. (copied from Hamilton).

Testudo hurum and *T. chin*, Hamilton, icon. ined.

? *Trionyx Jeudi*, Gray, P. Z. S. 1869, p. 217, fig. 19; Suppl. Cat. Shield Rept. p. 97, fig. 32 (skull).

Hardwicke figures a second species, under the name of

"Kaavez;" it is found in the Ganges, and grows to the weight of 120 pounds. The top of the head in this species is brown, black-lined, with a yellow spot on each side of the crown and at the back of the angle of the mouth. This had been named *Testudo hurum* by Dr. Hamilton, and is the *Trionyx hurum* of my 'Synopsis of Reptiles,' tab. x. Duméril and Bibron referred this species and figure to *Trionyx gangeticus*; but this was certainly a mistake, and has been a fertile source of error.

It is figured as *Trionyx hurum* in Gray's 'Illustrations of Indian Zoology' from Buchanan-Hamilton's drawings, where it is called *Testudo hurum*.

Of this species there is no specimen in the British Museum; but I have a suspicion that the skull which I have described as *Trionyx Jeudi* (Proc. Zool. Soc. 1869, p. 217, fig. 19; Gray, Suppl. Cat. Sh. Rept. p. 97, fig. 32) probably belongs to this species.

The skull named *T. Jeudi* has the nose rather elongate, produced forward, with a rather tapering outline; orbit further from the cavity of the nostrils than the diameter of the orbit; alveolar surface of the lower jaw with a very distinct central longitudinal ridge in front, with a deep pit on each side.

The British Museum has a second skull of this species, which was given to us by Mr. Theobald as the skull of his *Trionyx Phayrei*. It certainly is not the skull of the species described under that name in the Journal of the Linnean Society, nor of the tortoise described under that name by Dr. Anderson.

5. *Trionyx sewaare.*

The upper surface of the head uniform olive, with a distinct yellow spot on each side of the crown.

"*Sewaare*," Hardwicke, icon. ined. in B. M.
Trionyx gangeticus, var., Gray, Suppl. Cat. Shield Rept. p. 97.

Hab. Bengal.

Hardwicke figures a species under the name of "Sewaare," which grows to the weight of 160 pounds and upwards. It has a uniform brown head, with a large pale spot on the side of the crown behind the eyes, and a few similar spots on the back of the neck. The back is marked with six black eye-like spots. I know nothing of this tortoise in the adult state, and at one time considered it a variety of *Trionyx hurum*; but I believe that it is quite distinct.

There are in the British Museum two half-grown specimens (95 *a* & *b*) agreeing in some respects with these figures, one of which is marked with six spots, and the other has the anterior pair deficient. Unfortunately they are too young to have the sternal callosities developed.

There are in the Museum three half-grown specimens, possibly of this tortoise, which I mentioned under *Trionyx gangeticus* in the Suppl. Cat. Shield Rept. They may be only varieties of the preceding species.

6. *Trionyx ocellatus.*

Young only known. Callosities not developed; nose before the eyes with a broad lunate yellow spot.

Testudo ocellata, B. Hamilton, icon. ined.
Trionyx ocellatus, Gray, Ill. Ind. Zool. tab. (copied from Hamilton).
Gymnopus ocellatus, Duméril & Bibron, Erpét. Gén. iv. p. 9.

Hab. India (B.M.).

A young specimen in the British Museum is very like the *Trionyx ocellatus* of Gray (Illust. Indian Zool. tab. 78), copied from the *Testudo ocellatus* of Dr. Hamilton's drawings. It chiefly differs in the crown of the head being black and minutely punctate like the rest of the head, instead of being uniformly bluish as in the figure. It is at once known by the broad yellow lunate mark over the nose just before the eyes, and the large yellow spot behind each eye. Duméril and Bibron regard this as a species under the name of "*Gymnopus ocellatus*, Hardwicke;" and they refer to it *Trionyx gangeticus*, Guérin (Cuvier, Règne Animal, tab. 1. fig. 6), from specimens in the Paris Museum sent home by Duvaucel. This figure is not very characteristic.

Duméril and Bibron refer to *Trionyx gangeticus*, Cuvier, Règne Animal, tab. i. fig. 6; but the figure does not represent the characters of this species. And they also, curiously enough, refer to *Trionyx hurum*. They say that there are five specimens in the Paris Museum sent by Duvaucel; but they do not mention the peculiar broad yellow band across the nose, and their specimens may be only the young of *Trionyx gangeticus*.

7. *Trionyx Bellii.*

Young only known. Callosities not developed. Upper part of the head black, white-spotted on the crown, with a red spot on the sides of the temple and on the angles of the mouth.

Trionyx gangeticus, Cuvier, Bell's MS.; Gray, Tortoises, Terrapins, and Turtles, p. 11, tab. 51.

Hab. Asia.

I only know this species from Mr. Bell's figure. It is very like *T. ocellatus*; but the nose is black: the back of the crown is not to be seen, as the head is partially withdrawn.

Mr. Bell's specimen is probably in the museum at Cambridge with the rest of his collection.

Schlegel, in the 'Fauna Japonica' (tab. v. fig. 7), represents a head which he calls *Trionyx stellatus*, var. *japonicus*. The upper surface is pale-coloured, with pale spots on the edge of the lips and sides of the neck, the latter being the largest. At tab. vii. he figures the animal; but the specimen appears to be bleached. It probably belongs to this genus.

Landemania.

1. *Landemania perocellata.*

Trionyx perocellatus, Gray, Cat. Tort. B. M. p. 48; Cat. Shield Rept. p. 65, tab. 31.
Potamochelys? *perocellatus*, Gray, P. Z. S. 1864, p. 86.
Landemania? *perocellata*, Gray, P. Z. S. 1869, p. 216; Suppl. Cat. Shield Rept. p. 96.

Hab. China, Chusan.

Trionyx tuberculatus, Cantor's drawings; Gray, P. Z. S. 1861, p. 42.
Potamochelys tuberculatus, Gray, P. Z. S. 1864, p. 87; Suppl. Cat. Shield Rept. p. 105.

Hab. Chusan.

I believe this is the same as the preceding, as is also the half-dried specimen called *Landemania irrorata*, Gray, Suppl. Cat. Shield Rept. p. 96, fig. 1 (sternum). They all have a black streak from the back edge of the eye, extending along the upper part of the side of the neck.

Potamochelys.

The genus *Potamochelys* of Fitzinger, as restricted by me in the 'Proceedings of the Zoological Society' for 1864 and 1869 and in the 'Supplement to the Catalogue of Shield Reptiles' (p. 104, fig. 34), should be erased from the system. The skull figured (which was presented to the museum by Prof. Oldham), now that we have other skulls to compare with it, proves to be the skull of an *Emyda*, with the figure of which in Wagler I had compared it when I first described it. The animal described as *Potamochelys stellatus* proves to be *Trionyx gangeticus* of Cuvier, having no alliance with *T. javanicus* of Geoffroy, which is an *Aspilus*.

I feel considerable regret but no shame in making this confession, when one considers the very imperfect materials I had to work on when I wrote the "Revision of the Species of Trionychidæ;" and any person who will follow my papers on the different genera of that family will see the disadvantages under which I laboured, and how I had to feel my way as specimens illustrative of the subject were gradually received.

Dogania.

Dogania subplana.

Trionyx subplanus, Geoffr. Ann. du Mus. iv. p. 15, tab. v. fig. 1; Cuvier, Oss. Foss. v. pt. 2, tab. xiii. fig. 5 (dorsal disk only); Gray, Ill. Ind. Zool. tab.

Gymnopus subplanus, Duméril & Bibron, Erpét. Gén. p. 492.

General Hardwicke in his drawings figures the upper and lower surfaces of a stuffed animal, which I believe he received from Java, without a name. These figures are copied in the 'Illustrations of Indian Zoology' under the name *Trionyx subplanus*, Geoffr.

The specimen was young and had not the sternal callosities developed.

MM. Duméril and Bibron, because the animal is figured by Hardwicke, erroneously say it lives in the Ganges.

This animal is not known in the adult state. The specimen described as *Sarbieria frenata* (Suppl. Cat. Shield Rept.) is evidently a specimen of this species approaching to maturity, having four slightly developed callosities, as the specimen described as *Dogania Güntheri* also has; so that I have no doubt that the adult animal has four well-developed callosities, and the odd front bone united to the rest of the dorsal disk.

** *Sternal callosities two, lateral; broad and well developed in the adult.*

Rafetus.

1. *Rafetus euphraticus*, Gray, Cat. Sh. Rept. p. 103.

*** *Sternal callosities two, lateral, narrow, linear, on the suture between the pair of lateral bones.*

Aspilus.

The front odd bone of the dorsal disk is small and smooth, with a central rounded callosity in the adult.

The palatine groove in *Aspilus javanicus* is moderately narrow, rather deep, and of the same diameter through the whole of its length.

† *Forehead with radiating black lines.*

1. *Aspilus gataghol.* (The Gataghol.)

Testudo gataghol, Hamilton, icon. ined.

Trionyx javanicus, Gray, Ill. Ind. Zool. tab. (copied from B. Hamilton).

Hab. India.

This mud-tortoise is very like *Trionyx gangeticus* with its radiated head; but Buchanan-Hamilton's figure shows only two very narrow lateral callosities. I have never seen this species.

†† *Head white-spotted.*

2. *Aspilus javanicus.* (The Boulousse.)

Amyda javanica, Schweigger's MS., quoted by Geoffroy.
Trionyx javanicus (*Trionyx de Java*), Geoffr. Ann. du Mus. vol. iv. p. 15, tab. iii. fig. 2.
Aspidonectes javanicus, Wagler, Amphib., Atlas, tab. 2. figs. iii.–xiii. (fig. iii. copied from Geoffroy).
Trionyx cariniferus, Gray, Cat. Shield Rept. B. M. p. 67, t. 32 (from a specimen in spirit).
Aspilus cariniferus, Gray, P. Z. S. 1864, figs. 4–6 (skull), 1869, p. 213; Suppl. Cat. Shield Rept. p. 101, fig. 33 (skull).
Gymnopus javanicus, Duméril & Bibron, Erpét. Gén. p. 493.

Hab. Java.

Schlegel, in the 'Fauna Japonica' (tab. v. fig. 6), figures the head of a mud-tortoise under the name of *Trionyx stellatus*, var. *javanicus*, which is mottled above and below and probably represents this species.

3. *Aspilus ornatus.*

Trionyx ornatus, Gray, P. Z. S. 1861, p. 41, tab. v. (young).
Aspilus? ornatus, Gray, P. Z. S. 1864, p. 85; Suppl. Cat. Shield Rept. p. 103.

Hab. Camboja.

Fam. **Emydidæ.**

Emyda.

General Hardwicke figures a spotted example of this genus with the upper part of the head spotted, which is copied as *Trionyx punctatus*, jun., in Gray's 'Illustrations of Indian Zoology.'

General Hardwicke figures a much larger specimen from Futteghur, which he says is called "*Bun-Goma*," which is the country name for the land-turtle commonly called "*Turpin*." The lower side shows the sternal callosities well developed. These figures are copied in my 'Illustrations of Indian Zoology' under the name *Trionyx granosus*. The back is uniform olive-green; and the upper part of the head, neck, and limbs is green, with two pale orange spots, one on each side of the back of the crown. I do not know whether this difference of colour depends on age or not.

Buchanan-Hamilton, in his drawings, calls this tortoise *Testudo dura*.

Geoffroy describes the species of this genus as *Trionyx coromandelicus* (Ann. du Mus. iv. p. 16, tab. v. fig. 1).

The skull is figured as *Potamochelys stellatus*, Gray, P. Z. S. 1864, p. 85, figs. 7 & 8(skull); Suppl. Cat. Shield Rept. p. 105, fig. 34 (skull only).

Schlegel figures the head of *Trionyx granosus* ('Fauna Japonica,' Chelon. tab. v. fig. 4). It is of uniform colour.